

ABSTRACT OF THE DISCLOSURE

A power amplifier pre-distorter is formed by a FIR filter structure which includes an individual look-up table for each filter tap, where each look-up table represents a sampled polynomial in a variable representing signal amplitude, and means for selecting, from each filter tap look-up table, a filter coefficient that depends on the amplitude of a corresponding complex signal value to be multiplied by the filter tap. A training method for such a pre-distorter determines (S1) a first estimate of a first look-up table assigned to a first filter tap, assuming a second look-up table assigned to a second filter tap is set to predetermined table values. Thereafter the method determines (S2) a second estimate of the second look-up table, assuming the first look-up table is set to the determined first estimate. If deemed necessary, the method includes the further steps (a) refining (S3) the first estimate refined, assuming the second look-up table is set to the latest determined second estimate, and (b) refining (S4) the second estimate, assuming the first look-up table is set to the latest determined first estimate. Steps (a) and (b) may be repeated (S5) until convergence is reached.

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
23 December 2004 (23.12.2004)

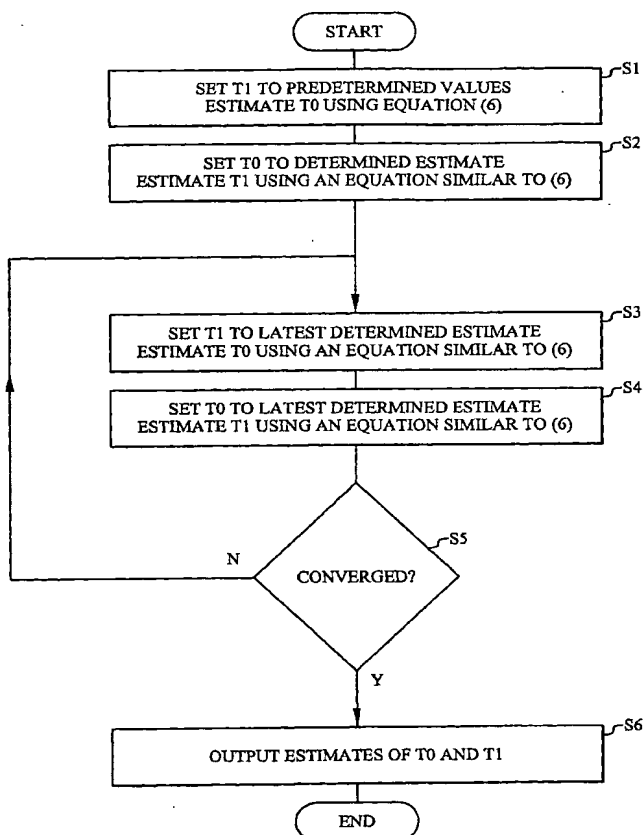
PCT

(10) International Publication Number
WO 2004/112240 A1

- (51) International Patent Classification⁷: **H03F 1/32** (74) Agent: AROS PATENT AB; P.O. Box 1544, S-751 45 Uppsala (SE).
- (21) International Application Number: PCT/SE2003/001032 (81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), CZ, DE (utility model), DE, DK (utility model), DK, DM, DZ, EC, EE (utility model), EE, ES, FI (utility model), FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK (utility model), SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (22) International Filing Date: 18 June 2003 (18.06.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (71) Applicant (*for all designated States except US*): TELEFONAKTIEBOLAGET LM ERICSSON (publ) [SE/SE]; S-164 83 Stockholm (SE).
- (72) Inventor; and
- (75) Inventor/Applicant (*for US only*): REXBERG, Leonard [SE/SE]; Carl Bondes Väg 58, S-165 74 Hässelby (SE).
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,

[Continued on next page]

(54) Title: POWER AMPLIFIER PRE-DISTORTION



(57) Abstract: A power amplifier pre-distorter is formed by a FIR filter structure which includes an individual look-up table for each filter tap, where each look-up table represents a sampled polynomial in a variable representing signal amplitude, and means for selecting, from each filter tap look-up table, a filter coefficient that depends on the amplitude of a corresponding complex signal value to be multiplied by the filter tap. A training method for such a pre-distorter determines (S1) a first estimate of a first look-up table assigned to a first filter tap, assuming a second look-up table assigned to a second filter tap is set to predetermined table values. Thereafter the method determines (S2) a second estimate of the second look-up table, assuming the first look-up table is set to the determined first estimate. If deemed necessary, the method includes the further steps (a) refining (S3) the first estimate refined, assuming the second look-up table is set to the latest determined second estimate, and (b) refining (S4) the second estimate, assuming the first look-up table is set to the latest determined first estimate. Steps (a) and (b) may be repeated (S5) until convergence is reached.

WO 2004/112240 A1



SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— *with international search report*